BeAGLE: e + ^{3}He

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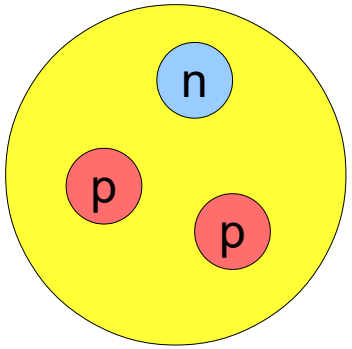
$e + {}^3He \rightarrow e' + p + p + X$

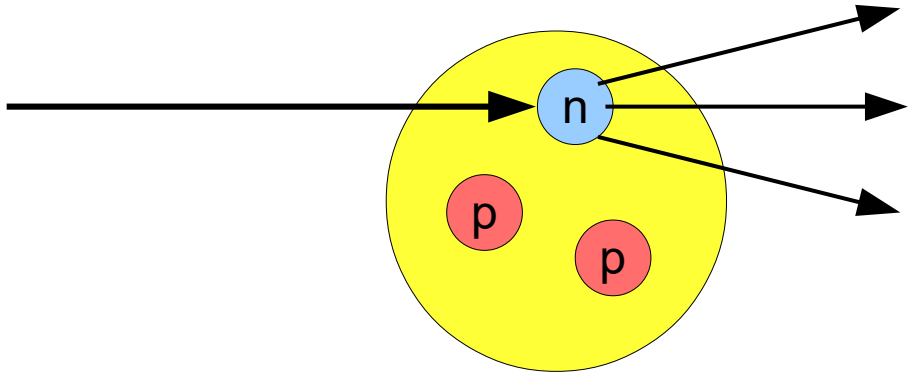
- Symptom is that the event fails ~80% of the time and when it doesn't fail, the p+p system has very little kinetic energy in it's own CM.
- It is NOT confusion over "^{2}He=diproton". For DPMJET/Fluka M(^{2}He)≈2M$_p$. No false binding.
- It's a kinematic / conceptual problem.

3He in BeAGLE / DPMJET



DPMJET Nuclear model is:
3 on-mass-shell nucleons sitting in a potential.

M(^{3}He)= 2.80839 GeV
M(p+p+n)=2.81611 GeV
8 MeV binding energy



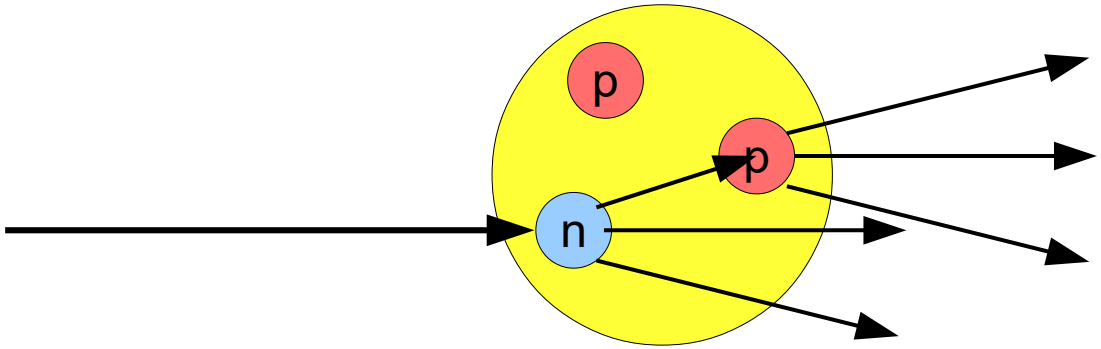
The "remnant" 4-momentum is calculated by momentum conservation.
E.g. for energy, take E_{eTRF}+M(^{3}He) and subtract out the Pythia KS==1 particles.
Typically, this leaves $E_{pp} < 2M_p$.

Two prong approach

- Simple ad-hoc approach:
  - Treat spectator nucleons as on mass-shell, leading to too much energy (as in e+D).
  - Then I have an ad-hoc prescription for removing this excess energy from the whole system.
  - Effectively steals energy from hard process to put protons on mass-shell while leaving their 3-momentum not too far from the original p_F distribution.
- Use spectral function etc. Kong w/ Jackson

Additional issue

- However we handle the kinematics, we have to make sure that the case of INC is handled consistently, which is not entirely trivial.



Important to push this

- Z/A for ^{3}He is very different from C or Pb and the proton "off-momentum" detector is probably not well optimized for proton detection from ^{3}He.
- Goal: Some results by end of August.